UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,039	08/29/2003	Ian M. Bennett	PHO 99004CIP	1543

23694 7590 09/28/2007
J. NICHOLAS GROSS, ATTORNEY
2030 ADDISON ST.
SUITE 610
BERKELEY, CA 94704

EXAMINER	
LERNER, MARTIN	
ART UNIT	PAPER NUMBER
2626	
MAIL DATE	DELIVERY MODE
09/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/653,039	BENNETT, IAN M.	
	Examiner	Art Unit	
	Martin Lerner	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 to 15 and 22 to 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 to 15 and 22 to 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 to 3, 5, 9, and 22 to 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.*

Concerning independent claims 1 and 22, *Kupiec ('920)* discloses a speech recognition system and method, comprising:

"a speech recognition engine for generating recognized words taken from an articulated speech utterance" – a speech recognizer can be used as a "front end" to an information retrieval system (column 4, lines 28 to 46); transducer 20 converts a user's spoken utterance into a signal that can be processed (column 5, line 56 to column 6, line 11: Figure 1);

"[a natural language engine configured for] linguistically processing said recognized words to generate search predicates for said articulated speech utterance" – query constructor 70 uses hypotheses to construct one or more queries ("search predicates") that will be sent to IR subsystem 40 for execution (column 11, lines 9 to 41: Figure 1);

"wherein said search predicates correspond to logical operators to be satisfied by a potential recognition match" – queries comprise words (search terms) with Boolean operators and supplemental proximity and order constraints expressible between words ("logical operators") (column 6, line 34 to column 7, line 50: Figure 1); depending upon results obtained, additional queries can be constructed by increasing a proximity value k (column 11, lines 9 to 41);

"a query formulation engine adapted to convert said recognized words and said search predicates into a structured query suitable for locating a set of one or more corresponding recognized matches for said articulated speech utterance" – IR subsystem 40 can perform certain IR query operations in a query language that expresses Boolean, proximity, and ordering or sequence relationships between search terms in a form understandable by IR subsystem 40 (column 6, line 52 to column 7, line 50: Figure 1);

"[said natural language engine being further configured for] linguistically processing said set of one or more corresponding recognized matches to determine a final match for said articulated speech utterance using both semantic decoding and statistical based processing performed on said recognized words" – semantic co-occurrence filtering ("semantic decoding") generates alternative hypotheses in a variety of ways, including consulting a thesaurus and consulting a table of related words; when two or more words of a hypothesis appear in proximity to one another in a number of documents of the corpus, this is taken as an indication that the words are semantically related (column 23, lines 1 to 62); hypothesis generation proceeds to develop

alternative possible transcriptions for each word spoken by a user based on a statistical model of performance of the transcriber 50; probabilities can be associated with each alternative "corrected" transcription to express its relative likelihood based on the statistical model ("statistical based processing") (column 9, lines 52 to 67: Figure 1).

Concerning independent claims 1 and 22, the only element not expressly disclosed by *Kupiec ('920)* is a natural language engine for processing recognized words to generate search predicates. *Kupiec ('920)* discloses processes for semantic co-occurrence filtering that may suggest natural language processing, but does not employ the term 'natural language'. Still, it is well known to employ natural language processing for speech recognition to constrain likely results in accordance with meanings associated with natural speech. Specifically, *Junqua et al.* teaches a speech understanding system for receiving a spoken request against a knowledge database of programming information for automatically selecting a television channel. A natural language processor 34 includes a local parser 36 and a global parser 38 for further analyzing and understanding the semantic content of digitized words provided by speech recognizer 32. (Column 4, Lines 41 to 55: Figure 1) An objective is to permit a viewer to concentrate on his/her goal without worrying about the style of language he/she uses to communicate with the speech understanding device. (Column 2, Lines 30 to 42) It would have been obvious to one having ordinary skill in the art to construct a search query of *Kupiec ('920)* with semantic constraints of a natural language engine as taught by *Junqua et al.* for a purpose of permitting a user to communicate in any style of language.

Concerning claims 2 and 25, *Kupiec ('920)* discloses an initial query ("first level query" or "a preliminary query") and a reformulated query ("customizes said first level query . . . to generate a second level query" or "a final query") (column 11, lines 9 to 67); both an initial query and a reformulated query are based on recognized words and search predicates.

Concerning claims 3 and 24, *Kupiec ('920)* discloses that both an initial query and a reformulated query are based on recognized words and search predicates; at a simplest level, an initial query is constructed for all documents that match the search terms within 10 words of one another (column 11, lines 23 to 67); thus, construction of an initial query is performed at the same time as construction of search predicates because an initial query contains search predicates.

Concerning claim 5, *Junqua et al.* discloses that global parser 38 determines an appropriate task frame of what the user's desired action is, whether to watch a program, record a program, or inquire what programs are on (column 5, lines 17 to 45: Figures 1 and 2); a task frame defines an environment for a query, and is "a context parameter".

Concerning claim 9, *Junqua et al.* discloses a speech understanding system and method that operates in real time, implicitly.

Concerning claim 23, *Kupiec ('920)* discloses an optional speech synthesizer 31 can provide speech output of a synthetic reading of portions of retrieved documents (column 12, lines 42 to 46: Figure 1).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.* as applied to claim 1 above, and further in view of *McDonough et al.*

Kupiec ('920) discloses semantic co-occurrence filtering based on a proximity of words to one another in a number of documents (column 23, lines 56 to 67), but omits calculating a term frequency based on a lexical distance between each word and one or more topic queries. However, *McDonough et al.* teaches topic discrimination for a speech recognition system, where one preferred method employs a Kullback-Liebler distance measure, providing a measure of dissimilarity of the occurrence patterns of an event for a given topic as opposed to all other topics. (Column 11, Lines 40 to 60) It is suggested that improved speech recognition can be achieved if a potential topic can be detected for a set of potential speech events. (Column 3, Line 63 to Column 4, Line 24) It would have been obvious to one having ordinary skill in the art to calculate a term frequency based on a lexical distance between words and one or more topic queries as taught by *McDonough et al.* in a speech recognition system using semantic co-occurrence filtering of *Kupiec ('920)* for a purpose of improving speech recognition by topic discrimination.

Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.* as applied to claims 1 and 22 above, and further in view of *Barclay et al.*

Junqua et al. does not expressly disclose placing a speech query recognition system on a server computer, so that the speech recognition is distributed across a client-server architecture to reduce transmission latencies, multiple servers, and controlling a web page. However, distributed speech recognition in a client-server architecture is well known. Specifically, *Barclay et al.* teaches a client-server speech recognizer, where processing capabilities are distributed between the client and the server. (Abstract) A client digitizes speech, extracts features, and quantizes the features, and a server performs speech recognition and natural language understanding. Latency is reduced because lower bandwidths are required, as less data needs to be communicated between the client and the server. (Column 4, Lines 1 to 16) Speech recognition capabilities may be incorporated into a World-Wide-Web browser (column 8, lines 36 to 64: Figure 4), and a general architecture distributes between one client and a plurality of servers (column 9, lines 31 to 42: Figure 6). An objective is to process speech with large vocabularies and grammars in real time with a client computer being a laptop. (Column 4, Lines 10 to 16) It would have been obvious to one having ordinary skill in the art to incorporate the client/server architecture for distributed speech recognition of *Barclay et al.* into a speech understanding system and method of *Junqua et al.* for a purpose of processing speech with large vocabularies and grammars in real time on a laptop.

Claims 7, 8, 14, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.* as applied to claims 1 and 22 above, and further in view of *Appelt et al. ('026)*.

Junqua et al. discloses natural language processing to determine semantic content, but omits determining noun-phrases to compare and to provide a final match, and discloses searching with key words, but omits SQL search predicates. However, *Appelt et al. ('026)* teaches information retrieval by natural language querying, where noun groups and noun phrases are utilized. (Column 7, Line 61 to Column 8, Line 29; Column 9, Lines 28 to 51) A query is converted into an SQL query. (Column 6, Lines 13 to 26). An objective is to provide search results to users in a timely fashion through natural language to support accurate and fast searches from multimedia sources of information. (Column 4, Lines 22 to 39) It would have been obvious to one having ordinary skill in the art to provide the features of determining noun phrases and SQL search predicates as taught by *Appelt et al. ('026)* in a speech understanding system and method of *Junqua et al.* for a purpose of providing fast searches from multimedia sources of information.

Claims 10 to 12 and 27 to 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.* as applied to claims 1 and 22 above, and further in view of *Joost*.

Kupiec ('920) omits the features of distributing speech recognition across a client-server architecture, where a client generates an amount of speech data that is

optimized on a case by case basis to reduce recognition latencies, performing recognition across multiple servers, and a speech utterance that can correspond to one of more than 100 potential matches in less than 10 seconds. However, *Joost* teaches distributed hardware sharing for speech processing, where a speech recognizer is assigned to an application dialog on a per-utterance basis ("optimized on a case by case basis"). (Column 3, Lines 46 to 48). An information system is provided where a user undertakes to access a large data base 20, or to an ordering service for items such as train tickets. (Column 1, Line 67 to Column 2, Line 5) The server may host several speech recognizer instances all operating under a constraint of real-time, that may well be in the order of a tenth of a second. (Column 3, Lines 6 to 14; Column 4, Lines 39 to 45) One tenth of a second is clearly less than 10 seconds, and "notice" is taken that a large database for accessing cities for train tickets involves more than 100 cities as potential matches. Natural language speech dialog and speech recognizers may be collected on a plurality of servers 116, 118 ("across multiple servers"). (Column 3, Line 64 to Column 4, Line 12) An objective is to provide load distribution and reduce delay ("reduce recognition latencies"). (Column 3, Lines 11 to 14; Column 4, Lines 41 to 45) It would have been obvious to one having ordinary skill in the art to provide the features of a client/server architecture for natural language speech recognition as taught by *Joost* in a speech recognition system and method for information retrieval of *Kupiec ('920)* for a purpose of providing load distribution and reducing delay.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kupiec ('920)* in view of *Junqua et al.* as applied to claim 1 above, and further in view of *Agarwal et al. ('196)*.

Junqua et al. omits a relational database that is updated asynchronously to reduce retrieval latency. However, *Agarwal et al. ('196)* teaches that it is common for relational databases to be updated in an asynchronous manner to avoid the inefficiencies of re-reading records. It would have been obvious to one having ordinary skill in the art to asynchronously update a relational database as taught by *Agarwal et al. ('196)* to search multimedia databases of *Junqua et al.* for a purpose of avoiding inefficiencies of re-reading records.

Response to Arguments

Applicant's arguments filed 14 August 2007 have been considered but are moot in view of the new grounds of rejection, necessitated by amendment. Applicant's amendments to independent claims 1 and 22, requiring that search predicates correspond to logical operators, and to claim 12, requiring that a client's transmission of speech data is optimized on a case by case basis, necessitate new grounds of rejection, and new issues, involving the consideration and application of new prior art of *Kupiec ('920)* and *Joost*.

However, Applicant's argument that there is a clear art-recognized meaning for the term "search predicate" is traversed. It is maintained that a search predicate does not necessarily require logical operators. On a simplest level, a search may be

executed by looking for all the words in a search query. Of course, one may contend that it is implicitly understood that looking for all the words in a search query implies a logical AND operator. However, Applicant has submitted no evidence tending to show that the term "search predicate" must be interpreted as necessarily requiring logical operators. Thus, Applicant's amendments of independent claims 1 and 22, requiring that the search predicates correspond to logical operators, raise new issues.

Conclusion

Applicant's amendment necessitated the new grounds of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

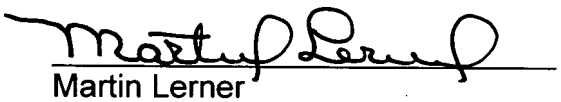
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (571) 272-

7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ML
9/20/07



Martin Lerner
Examiner
Group Art Unit 2626